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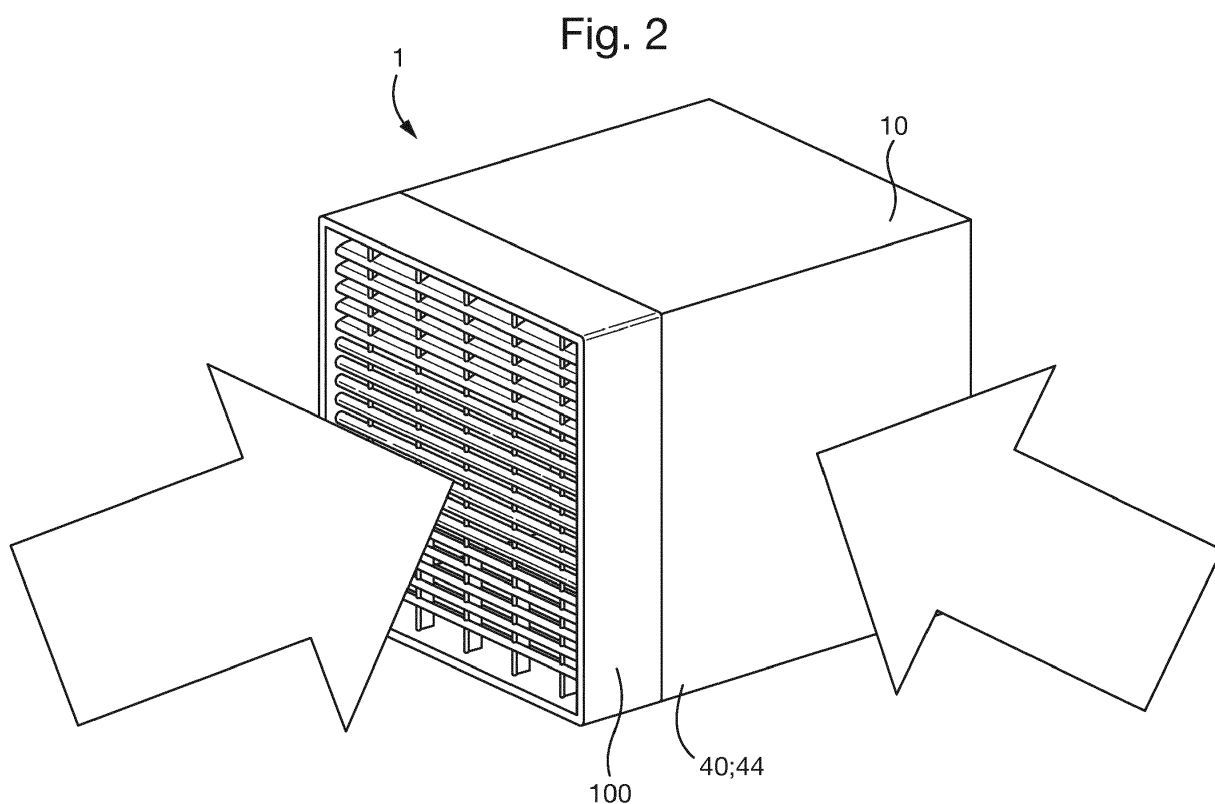
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(54) **FLOW GUIDE FOR HEAT EXCHANGER**

(57) There is provided a flow guide (100) for a heat exchanger structure (10), comprising one or more aerofoils (150) configured to distribute a fluid across an inlet face (40,44) of a heat exchanger structure (10).



Description

FIELD

[0001] The present disclosure relates generally to a flow guide for a heat exchanger, methods of guiding a fluid onto a heat exchanger, and more specifically to a heat exchanger and systems or methods associated therewith.

BACKGROUND

[0002] Heat exchangers, for example heat recovery ventilators or "air-to-air" heat exchangers are known in the art and provide a way of transferring heat from one fluid to another without mixing the fluids. This is typically achieved by layering a series of parallel plates, alternate pairs of which are enclosed on two sides to form twin sets of ducts at right angles to each other. Each set of ducts contains either the input fluid stream or the extract fluid stream. In this manner, heat from one fluid stream may be transferred through the separating plates, and into the other fluid stream. The fluids are typically directed onto a portion of the face of the heat exchanger (i.e., the plane corresponding to the entrances to one set of ducts).

[0003] It is desired to improve the heat transfer achievable using a heat exchanger.

SUMMARY

[0004] In an aspect, the present disclosure provides a flow guide for a heat exchanger structure, comprising one or more aerofoils configured to distribute a fluid across an inlet face of a heat exchanger structure. The flow guide and heat exchanger structure may be provided in combination, and/or as part of a heat exchanger. The flow guide may be positioned adjacent to and/or in front of the inlet face of the heat exchanger structure.

[0005] In an aspect, the present disclosure also extends to a method of manufacturing a flow guide for a heat exchanger structure, the method comprising positioning one or more aerofoils on the flow guide such that the aerofoils distribute a fluid across an inlet face of a heat exchanger structure to which the flow guide is attached.

[0006] In any of the aspects or embodiments disclosed herein, the heat exchanger structure may be configured to transfer heat from one fluid to another using a first set of ducts that are intermixed with a second set of ducts. The ducts may be formed by a series of parallel plates. Each adjacent pair of parallel plates may be enclosed on two sides thereof, so as to form a duct having an inlet on one side of the heat exchanger structure and an outlet on the opposite side of the heat exchanger structure.

[0007] The inlet face may correspond to a plane formed by duct inlets of one of the sets of ducts. The heat exchanger structure may be a cuboid, and the inlet face may correspond to a side of said cuboid (e.g., a side

having the duct inlets).

[0008] The one or more aerofoils may comprise a plurality of aerofoils configured to direct (or "re-direct") a fluid in a common direction. By "re-direct", it is meant that, in use, the general flow vector (or direction) of the fluid is changed from a first vector (or direction) prior to reaching the aerofoils to a second, different vector (or direction) once the fluid has passed the aerofoils.

[0009] The common direction may correspond to a specific portion of the inlet face of a heat exchanger structure.

[0010] The one or more aerofoils may comprise a first set of aerofoils, each of the first set of aerofoils being configured to direct fluid in a first direction, and a second set of aerofoils, each of the second set of aerofoils being configured to direct fluid in a second, different direction.

[0011] The first direction may be the direction of a first (e.g., bottom) portion of the inlet face of the heat exchanger structure (e.g., when the flow guide is placed in front of a heat exchanger structure in use), and the second direction may be the direction of a second, different (e.g., top) portion of the inlet face of a heat exchanger structure (e.g., when the flow guide is placed in front of a heat exchanger structure in use).

[0012] The flow guide may further comprise one or more flow restrictors configured to impede fluid flowing through one or more portions of the flow guide. The one or more portions of the flow guide may comprise a portion corresponding to (e.g., in use, positioned in front of) a third (e.g., central) portion of the inlet face of a heat exchanger structure.

[0013] The one or more flow restrictors may comprise cylindrical bars extending horizontally across the flow guide. The one or more aerofoils may extend horizontally across the flow guide.

[0014] The flow guide may further comprise one or more support structures configured to support the one or more aerofoils in position. The one or more support structures may be or comprise struts extending vertically across the flow guide and optionally oriented in the direction of fluid flow through the flow guide, such that the flow of fluid flowing through the flow guide is not substantially impeded by the one or more support structures. The one or more support structures (e.g., struts) may be flat and/or non-aerodynamic.

[0015] As discussed above the flow guide and heat exchanger structure may be provided as part of a heat exchanger. The flow guide may be a flow guide as described above, and may be configured to distribute a fluid to specific portions of the inlet face of the heat exchanger structure using the one or more aerofoils.

[0016] The fluid may be directed onto the flow guide by a component (e.g., a heat exchanger inlet), and the component may be configured to direct fluid onto or at a portion (e.g., a central portion) of the flow guide and/or heat exchanger. The one or more aerofoils may be configured to direct fluid away from the portion of the flow guide and/or heat exchanger onto which fluid is directed

by the component.

[0017] The flow guide may be a first flow guide, and the inlet face may be a first inlet face. The heat exchanger may comprise a second inlet face corresponding to the plane formed by duct inlets of the other of the sets of ducts.

[0018] A second flow guide may be positioned adjacent to and/or in front of the second inlet face of the heat exchanger structure. The second flow guide may comprise any of the features described above in respect of the first flow guide, although references to "inlet face" and the like would become references to the "second inlet face" etc. For example, the second flow guide may comprise one or more aerofoils configured to distribute a fluid across the second inlet face of the heat exchanger structure.

[0019] In an aspect, the present disclosure provides a heat exchanger, comprising a flow guide as described above and a heat exchanger structure (e.g., a heat exchanger structure described above). The flow guide may be configured to distribute fluid to specific portions of the inlet face of the heat exchanger structure using the one or more aerofoils.

[0020] Additionally, or alternatively, the aerofoils may be configured on the flow guide in a manner that provides a more uniform flow rate of fluid across the inlet face as compared to a heat exchanger not employing said flow guide, and/or a heat exchanger and/or flow guide not employing the aerofoils.

[0021] The heat exchanger may comprise a heat exchanger inlet configured to direct the fluid at a portion of the heat exchanger structure. The flow guide may be positioned between the heat exchanger inlet and the heat exchanger structure, for example adjacent to and/or in front of the heat exchanger structure. The one or more aerofoils may be configured to direct fluid away from the portion of the heat exchanger structure at which fluid is directed by the heat exchanger inlet.

[0022] In an aspect, the present disclosure provides a method of using a flow guide as described above, the method comprising positioning the flow guide adjacent to and/or in front of a heat exchanger structure such that the one or more aerofoils distribute a fluid across an inlet face of a heat exchanger structure. The method may comprise directing fluid at the centre of the flow guide and/or heat exchanger structure, for example from a heat exchanger inlet.

[0023] In an aspect, the present disclosure provides a method of configuring a flow guide for a heat exchanger, wherein the heat exchanger comprises a heat exchanger structure configured to transfer heat from one fluid to another using a first set of ducts that are intermixed with a second set of ducts, and comprises an inlet face corresponding to a plane formed by duct inlets of one of the sets of ducts. The flow guide may be a flow guide as described in any of the aspects and embodiments described above.

[0024] The method may comprise configuring one or

more aerofoils on said flow guide in a manner that provides a more uniform flow rate of fluid across said inlet face as compared to a heat exchanger not employing said flow guide, and/or a heat exchanger and/or flow guide not employing the aerofoils.

[0025] Alternatively, or additionally, the method may comprise determining a flow pattern across the inlet face, identifying specific portions of the inlet face from the flow pattern that require an increased fluid flow rate to ensure a more uniform flow rate of fluid across the inlet face, and configuring one or more aerofoils on the flow guide in a manner that increases the flow rate of fluid at the specific portions, when the flow guide is positioned adjacent to and/or in front of the inlet face. For example, the aerofoils may be positioned and/or oriented such that fluid is directed towards the specific portions by the aerofoils when the flow guide is positioned adjacent to and/or in front of the inlet face.

[0026] The method may comprise determining, from said flow pattern, a portion of the inlet face that experiences the highest flow rate, and configuring one or more flow restrictors on the flow guide in a manner that decreases the flow rate of fluid at the portion of the inlet face that experienced the highest flow rate, when the flow guide is positioned adjacent to and/or in front of the inlet face. The one or more flow restrictors may comprise cylindrical bars extending across the flow guide, e.g., horizontally across the flow guide.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] Various embodiments will now be described, by way of example only, and with reference to the accompanying drawings in which:

- Fig. 1 shows an arrangement of a heat exchanger matrix;
- Fig. 2 shows a heat exchanger in accordance with an embodiment;
- Fig. 3 shows a flow guide for a heat exchanger in accordance with an embodiment;
- Fig. 4A shows a cross section of the flow guide along line 4-4 in Fig. 3;
- Fig. 4B shows a flange member for use in the flow guide of Fig. 4A;
- Fig. 5 schematically shows a flow distribution in accordance with an embodiment.

DETAILED DESCRIPTION

[0028] The present disclosure relates generally to a flow guide for a heat exchanger, for example a heat exchanger comprising a structure (or "matrix") that is configured to transfer heat from one fluid to another using a first set of ducts that are intermixed with a second set of ducts, wherein the sets of ducts are fluidly separate from one another. The fluids may be air or another gas, or in various embodiments a liquid. The heat exchanger struc-

ture may comprise an inlet face, which corresponds to the plane formed by the inlets to one of the sets of ducts. The flow guide may be configured to distribute a fluid across the inlet face using one or more aerofoils.

[0029] As used herein, an aerofoil may be defined as a body having a shape that produces an aerodynamic force (e.g., lift) on the aerofoil, when the aerofoil is moved through a fluid.

[0030] An example of a matrix (or heat exchanger structure) as described above is shown in Fig. 1, and is in the form of a substantially cubic or cuboid body 10 (although other shapes are possible) that is made up of a series of parallel plates 12. Each adjacent pair of parallel plates 12 are enclosed on two sides, so as to form a duct having an inlet on one side of the body 10, and an outlet on the opposite side of the body 10.

[0031] In the illustrated embodiment of Fig. 1, the body 10 has four faces 40, 42, 44, 46, as well as a top surface 48 and a bottom surface 49. The faces 40, 42, 44, 46 are at right angles to one another and form the two input and output faces of the matrix. As discussed below, a first, inlet face 40 and a second, output face 42 are associated with a first set of ducts, and a third, inlet face 44 and a fourth, output face 46 are associated with a second set of ducts.

[0032] As shown in Fig. 1, a bottom duct 20 may be formed using the lowest pair of plates 12, and comprises an inlet 22 on the first face 40 of the body 10, and an outlet 24 on a second, opposite face 42 of the body 10. The bottom duct 20 is enclosed by side elements 26 and 28 which span between the plates 12 forming the duct 20. Fluid entering the inlet 22 travels from the first face 40, through the duct 20, and then exits the matrix through the outlet 24 on the second face 42. A number of corrugations 29 may be provided inside the duct 20, which can help to provide structural support, as well as aid in heat transfer.

[0033] A duct 30 adjacent to the bottom duct 20 is similar in structure, but instead the inlet 32 to the adjacent duct 30 is located on the third face 44 of the body 10, and the outlet 34 of the adjacent duct 30 is located on the fourth face 46 of the body 10. The adjacent duct 30 is enclosed by side elements 36 and 38 which span between the plates forming the adjacent duct 30. Fluid entering the inlet 32 travels from the third face 44, through the duct 30, and then exits the matrix through the outlet 34 on the fourth face 46. Similar to the bottom duct 20, a number of corrugations 39 may be provided inside the adjacent duct 30, which can help to provide structural support, as well as aid in heat transfer.

[0034] The bottom duct 20 and the adjacent duct 30 are fluidly separate from one another and may be configured to transport different fluid flows through the matrix (or heat exchanger structure). The matrix may be positioned within a suitable housing, such that the faces 40, 42, 44, 46 are fluidly sealed from each other, as is known in the art.

[0035] The bottom duct 20 and the adjacent duct 30

form a pair of ducts, and the pattern formed by these ducts continues, such that a first set of ducts are inter-mixed with a second set of ducts.

[0036] The first set of ducts include the bottom duct 20, and are configured to transport a first fluid from the first face 40 to the second face 42. The inlets to each duct of the first set of ducts are located on the first face 40, and the outlets to each duct of the first set of ducts are located on the second face 42.

[0037] The second set of ducts include the adjacent duct 30, and are configured to transport a second fluid from the third face 44 to the fourth face 46. The inlets to each duct of the second set of ducts are located on the third face 44, and the outlets to each duct of the second set of ducts are located on the fourth face 46.

[0038] References to "first fluid" and "second fluid" herein should not be interpreted as the first and second fluids necessarily being structurally different (although they may be). In various embodiments, the first fluid and the second fluid may be the same or similar structurally (e.g., the first and second fluids may be air or a particular gas), but the first and second fluids will have a different temperature. This is typical of, e.g., heat recovery ventilation, where external air being transported into a building could correspond to the first fluid, and internal air being transported out of a building could correspond to the second fluid. In other embodiments, the first and second fluids may be structurally different, e.g., the first fluid could be oxygen gas and the second fluid could be nitrogen gas.

[0039] Furthermore, it is possible that the first and/or second fluids are liquid, or that one of the fluids is a liquid and the other is a gas.

[0040] Fig. 2 schematically shows a heat exchanger comprising a heat exchanger structure (e.g., body 10 of Fig. 1) and a flow guide 100 in accordance with an embodiment of the present disclosure. The various inlets and outlets of the heat exchanger structure are not shown in Fig. 2.

[0041] The flow guide 100 is positioned adjacent to (and/or in front of) an inlet face of the body 10 (e.g., the first face 40 or the third face 44 in Fig. 1) such that a fluid flowing through the heat exchanger structure passes through the flow guide 100 prior to entering the heat exchanger structure through the inlet face. The flow guide 100 is provided such that the fluid is distributed across the surface of the inlet face of the heat exchanger structure. This is achieved through the use of one or more aerofoils, which have been found to be particularly suitable for this purpose.

[0042] In various embodiments, the aerofoils may be configured such that the fluid is more evenly distributed across the inlet face of the heat exchanger structure. In other words, there is a more uniform flow rate of the fluid across the inlet face than if the flow guide 100 was not present. It has been found that in conventional arrangements fluid is directed onto a small portion of the heat exchanger structure (e.g., the centre) and the heat trans-

fer capabilities of the heat exchanger structure are not fully utilised as a result. Therefore various embodiments of the present disclosure are aimed at using aerofoils to provide a more even distribution of airflow across the heat exchanger structure.

[0043] The flow guide 100 is shown in more detail in Fig. 3 and comprises a bottom portion 110, middle portion 120 and top portion 130. A fluid to be transferred through the heat exchanger structure (e.g., the first fluid or second fluid described above) may be directed at the centre or middle portion 120 of the heat exchanger structure. This would typically mean that there is a larger fluid flow through the middle portion 120 than the top portion 130 and bottom portion 110.

[0044] To provide a managed (e.g., more even) distribution of fluid flow across the inlet face of the heat exchanger to which the flow guide 100 is attached, a plurality of aerofoils 150 are positioned at the top portion 130 and the bottom portion 110 of the flow guide 100. These aerofoils 150 are configured to direct air away from the centre of the heat exchanger structure, so as to reduce the fluid flow at the middle portion 120, and increase the fluid flow at the top portion 130 and bottom portion 110 respectively.

[0045] In order to assist the aerofoils in providing the managed distribution of fluid flow, a number of flow restrictors (e.g., bars) may be provided. In the illustrated example, these are provided as bars 140 in the middle portion 120 of the flow guide 100, which back up fluid such that it moves towards the aerofoils 150 in the top portion 130 and bottom portion 110. It should be noted that, unlike the aerofoils 150, the flow restrictors 140 are not intended to be aerodynamic.

[0046] The aerofoils 150 and the flow restrictors 140 are substantially straight and extend in a horizontal direction across the flow guide 100. The aerofoils 150 and the flow restrictors 140 are also parallel to each other. However, other embodiments are envisaged in which the aerofoils 150 and flow restrictors 140 (if provided) are not straight, and/or not parallel to each other. In the broadest aspects of the present disclosure, the aerofoils may have any shape or orientation to provide the function of directing fluid to a specific portion of the heat exchanger structure.

[0047] Referring back to Fig. 3, one or more support structures 160 may be provided to hold the aerofoils in place within the flow guide 100. The support structures 160 are in the form of vertically-oriented bars that are arranged across the flow guide (i.e., perpendicular to the aerofoils 150 and the flow restrictors 140), and may provide structural support to the aerofoils 150 and flow restrictors 140. This can help to prevent these components from moving substantially when a fluid is passed through the flow guide 100. The support structures 160 have a specific shape in this embodiment, which is described in more detail below (see Fig. 4B), but the support structures 160 can have any shape or orientation to provide the function of supporting the aerofoils.

[0048] Fig. 4A shows a cross-section through the flow guide 100 along plane 4-4 in Fig. 3, from which the distribution of the aerofoils 150 and the non-aerodynamic flow restrictors 140 can be seen in greater detail. As is evident from Fig. 4A, the aerofoils 150 are oriented (e.g., at an angle) such that an incoming fluid is directed towards the top or bottom of a heat exchanger structure to which the flow guide 100 is attached.

[0049] The aerofoils 150 comprise a first set of aerofoils 150A, wherein each of the first set of aerofoils 150A is configured to direct fluid towards the top portion 130 of the inlet face 40, 44, and a second set of aerofoils 150B, wherein each of said second set of aerofoils 150B is configured to direct fluid towards the bottom portion 110 of the inlet face 40, 44.

[0050] As will be appreciated, and generally, a fluid may be incoming from any direction, but will be directed to the portions of the heat exchanger structure most efficiently using aerofoils as aforesaid. Hence, the use of aerofoils in a flow guide as described herein is advantageous in its own right, and the broadest aspects of the present disclosure relate to the use of such aerofoils to distribute a fluid across an inlet face of the heat exchanger structure.

[0051] Referring back to the embodiment of Fig. 4A, the aerofoils 150A in the top portion 130 are oriented such that fluid impinging thereon (e.g., from any direction) is diverted substantially to the upper regions of a heat exchanger structure to which the flow guide 100 is attached, and the aerofoils 150B in the bottom portion 110 are oriented such that fluid impinging thereon (e.g., from any direction) is diverted substantially to the lower regions of a heat exchanger structure to which the flow guide 100 is attached. Of course, other orientations and arrangements are possible and may be provided, for example if air is intended to be directed to other parts of the inlet face of the heat exchanger structure.

[0052] The width of the flow restrictors 140 may be larger than the width of the aerofoils 150, such that the flow restrictors 140 force an increased amount of the fluid towards the aerofoils 150. As used in this embodiment, and generally throughout this disclosure, the width of the aerofoils 150 may be defined as the width or thickness (e.g., the largest width or thickness) of the aerofoil in a direction perpendicular to the chord of the aerofoil (which has a well-defined meaning in the art). In embodiments where the flow restrictors 140 have a non-uniform cross-section, the width of the flow restrictors may be the width substantially perpendicular to the direction of incoming fluid, or the largest width.

[0053] Fig. 4B shows a support structure 160 of the flow guide 100 in isolation. When taken in a cross-section perpendicular to the general direction of fluid flow through the flow guide 100, the support structure 160 has a relatively large cross-sectional area where the aerofoils 150 are attached thereto, namely in the top portion 130 and the bottom portion 110. The support structure 160 may be connected to each of the aerofoils 150 along at least

50%, 60%, 70%, 80% or 90% of the length of the aerofoils 150, in order to provide optimum support to the aerofoils. In the middle portion 120, the support structure 160 has a relatively small cross-sectional area, since the flow restrictors 140 have a smaller width than the aerofoils 150 as described above, and also won't be subject to as much, if any lateral force (e.g., lift) due to the flow restrictors 140.

[0054] Fig. 5 shows a cross-section of the flow guide 100 attached to a heat exchanger structure (e.g., body 10 as described above in respect of Fig. 1), as well as various flow lines showing approximately, and schematically how the flow guide directs air impinging thereon.

[0055] The flow restrictors 140 covering the middle portion 120 cause an increased amount of the fluid to be diverted to the top portion 130 and the bottom portion 110 of the flow guide 100, whereupon this diverted fluid impinges on the aerofoils 150 and is distributed to the top portion 130 and the bottom portion 110 of the heat exchanger structure respectively. Fluid that was already impinging on the aerofoils 150 will still do so, and will be distributed in the same manner.

[0056] The illustrated arrangement is suitable for most situations in which a heat exchanger structure is incorporated into a heat exchanger or other housing. Typically, in such applications the majority of the fluid will be drawn to the central region of the heat exchanger. However, various embodiments are envisaged in which the flow guide uses aerofoils to direct air to different portions of the heat exchanger structure. This could be for many reasons, for example the arrangement of ducts in the heat exchanger structure may not be uniform. In such a situation, it may be advantageous to use aerofoils to direct flow to areas of the heat exchanger structure that have the highest density of ducts. Various other arrangements are envisaged. As discussed above, the use of aerofoils to direct air in such a flow guide is advantageous in its own right, and independent of the structure of the heat exchanger.

[0057] Various embodiments extend to a method of configuring a flow guide (e.g., flow guide 100 as described above) for a heat exchanger, for example to ensure a more uniform flow rate of fluid through an inlet face of the heat exchanger in use, and increase the heat transfer capabilities of the heat exchanger. The heat exchanger may comprise a heat exchanger structure (e.g., the heat exchanger structure 10 described above), which may be configured to transfer heat from one fluid to another using a first set of ducts that are intermixed with a second set of ducts, and comprises an inlet face (e.g., inlet face 40,44 described above) corresponding to a plane formed by duct inlets (22,32) of one of the sets of ducts.

[0058] The method may comprise configuring one or more aerofoils on said flow guide in a manner that provides a more uniform flow rate of fluid across said inlet face as compared to a heat exchanger not employing said flow guide.

[0059] The method may comprise the steps of determining a flow pattern across the inlet face, identifying specific portions of the inlet face (e.g., the top portion 130 and bottom portion 110 in the example given above) from the flow pattern that require an increased and/or decreased fluid flow, for example to ensure a more uniform flow rate of fluid across the inlet face.

[0060] The method may further comprise configuring one or more aerofoils on the flow guide in a manner that increases fluid flow to the portions of the inlet face that require an increased fluid flow, when the flow guide is positioned adjacent to (and/or in front of) the inlet face, e.g., to ensure a more uniform flow rate of fluid across the inlet face.

[0061] The method may comprise incorporating one or more flow restrictors (e.g., the flow restrictors 140 described above) into the flow guide that are configured to restrict flow to other portions of the inlet face, which may be portions of the flow guide that require a decreased fluid flow (e.g., the middle portion 120 described above), for example to ensure a more uniform flow rate of fluid across the inlet face.

[0062] The method may further comprise positioning the flow guide adjacent to (and/or in front of) the inlet face (and, e.g., fluidly sealing the flow guide to the inlet face), for example such that a more uniform flow rate of fluid is achieved across the inlet face in use.

[0063] Although the present invention has been described with reference to preferred embodiments, it will be understood by those skilled in the art that various changes in form and detail may be made without departing from the scope of the invention as set forth in the accompanying claims.

Claims

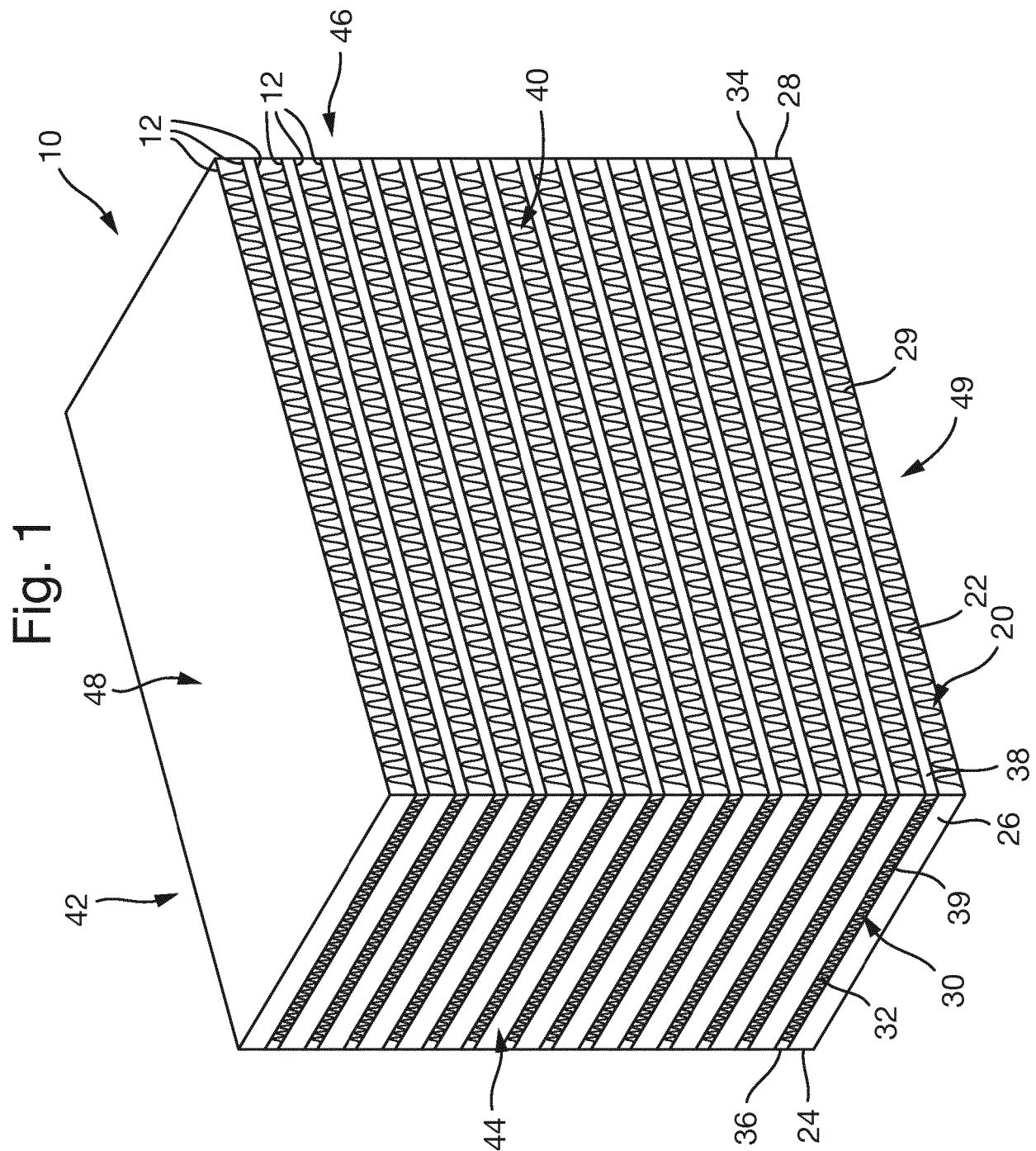
1. A flow guide (100) for a heat exchanger structure (10), comprising one or more aerofoils (150) configured to distribute a fluid across an inlet face (40,44) of a heat exchanger structure (10).
2. A flow guide as claimed in claim 1, wherein said heat exchanger structure (10) is configured to transfer heat from one fluid to another using a first set of ducts that are intermixed with a second set of ducts.
3. A flow guide as claimed in claim 1 or 2, wherein said inlet face (40,44) corresponds to a plane formed by duct inlets (22,32) of one of said sets of ducts.
4. A flow guide as claimed in claim 1, 2 or 3, wherein said one or more aerofoils (150) comprise a plurality of aerofoils (150A; 150B) configured to direct a fluid in a common direction.
5. A flow guide as claimed in claim 4, wherein said common direction corresponds to a specific portion (110,

130) of said inlet face (40,44) of a heat exchanger structure (10).

6. A flow guide as claimed in any preceding claim, wherein said one or more aerofoils (150) comprise a first set of aerofoils (150A), each of said first set of aerofoils (150A) configured to direct fluid in a first direction, and a second set of aerofoils (150B), each of said second set of aerofoils (150B) configured to direct fluid in a second, different direction. 5
7. A flow guide as claimed in claim 6, wherein said first direction corresponds to a bottom portion (110) of said inlet face (40,44) of said heat exchanger structure (10), and said second direction corresponds to a top portion (130) of said inlet face (40,44) of a heat exchanger structure (10). 10
8. A flow guide as claimed in claim 6 or 7, further comprising one or more flow restrictors (140) configured to impede fluid flowing through one or more portions of said flow guide (100). 15
9. A flow guide as claimed in claim 8, wherein said one or more portions of said flow guide (100) comprise a portion corresponding to a central portion (120) of said inlet face (40,44) of a heat exchanger structure (10). 20
10. A flow guide as claimed in claim 8 or 9, wherein said one or more flow restrictors (140) comprise cylindrical bars extending horizontally across the flow guide (100). 25
11. A flow guide as claimed in any preceding claim, wherein said one or more aerofoils (150) extend horizontally across said flow guide (100). 30
12. A flow guide as claimed in any preceding claim, further comprising one or more support structures (160) configured to support said one or more aerofoils (150) in position. 35
13. A flow guide as claimed in claim 12, wherein said one or more support structures (160) are struts extending vertically across said flow guide (100). 40
14. A heat exchanger, comprising a flow guide (100) as claimed in any preceding claim and a heat exchanger structure (10), wherein said aerofoils (150) are configured on said flow guide (100) in a manner that provides a more uniform flow rate of fluid across said inlet face (40,44) as compared to a heat exchanger not employing said flow guide (100). 45
15. A method of configuring a flow guide (100) for a heat exchanger, wherein the heat exchanger comprises a heat exchanger structure (10) configured to trans- 50

fer heat from one fluid to another using a first set of ducts that are intermixed with a second set of ducts, and comprises an inlet face (40,44) corresponding to a plane formed by duct inlets (22,32) of one of said sets of ducts, the method comprising:

configuring one or more aerofoils (150) on said flow guide (100) in a manner that provides a more uniform flow rate of fluid across said inlet face (40,44) as compared to a heat exchanger not employing said flow guide (100).



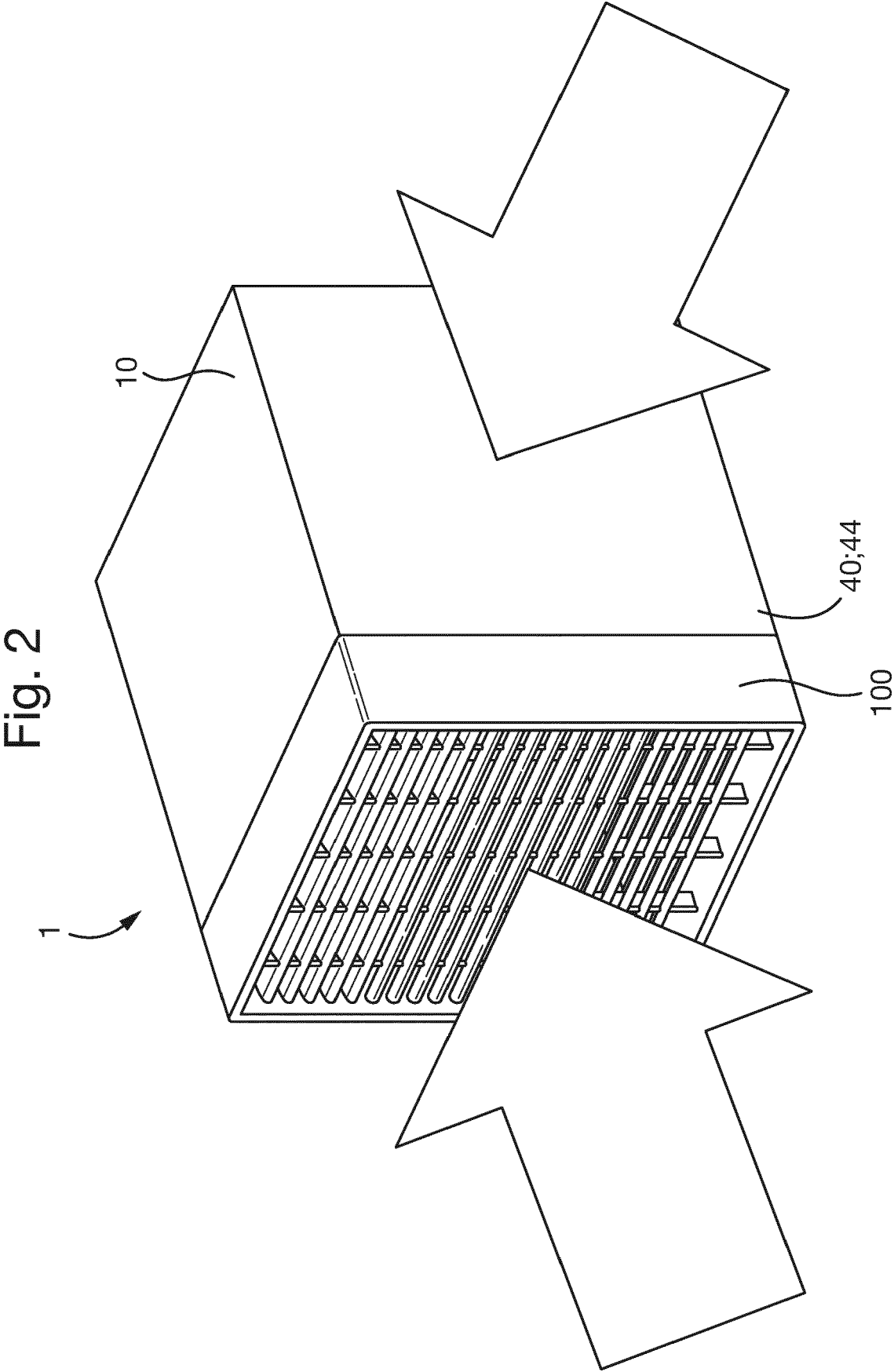


Fig. 3

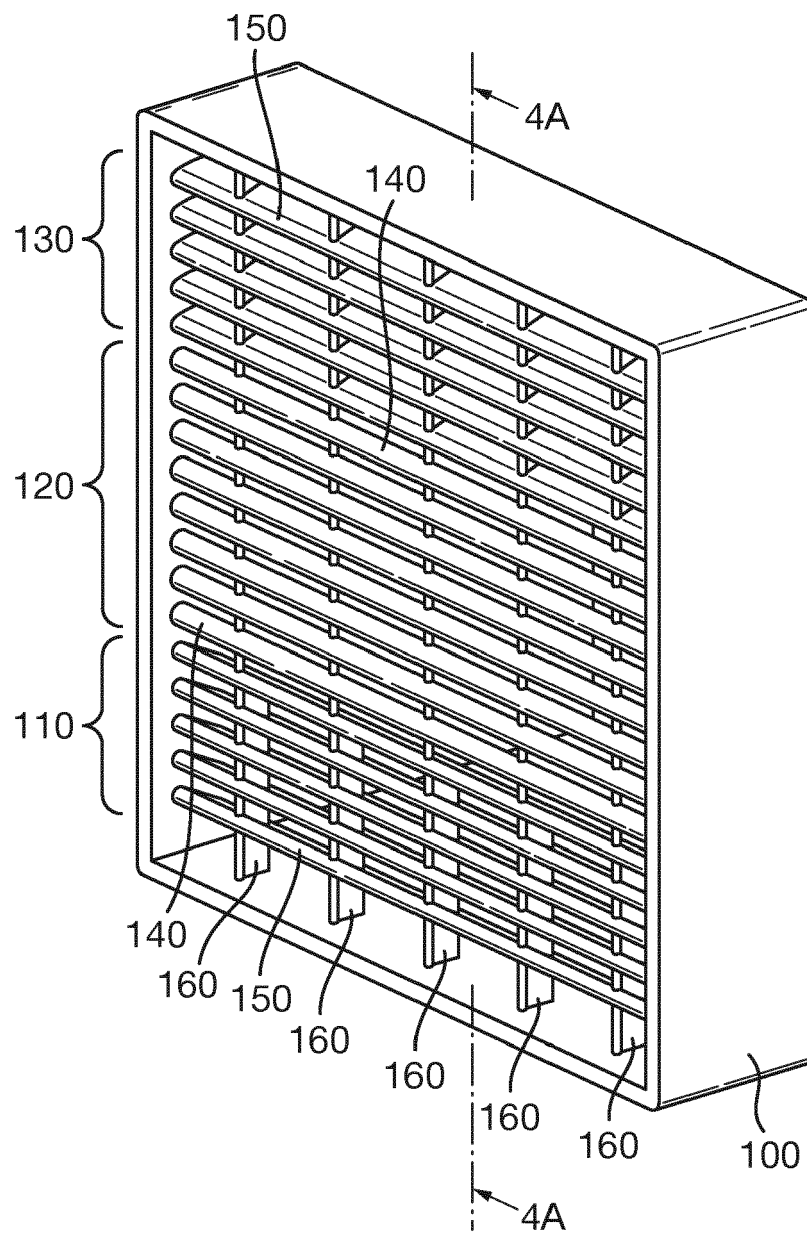


Fig. 4A

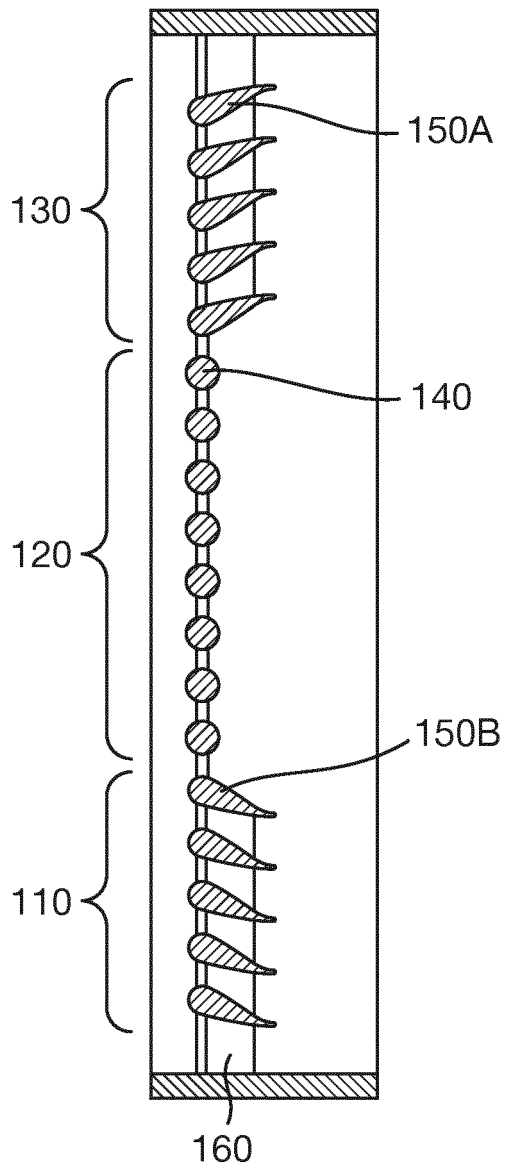


Fig. 4B

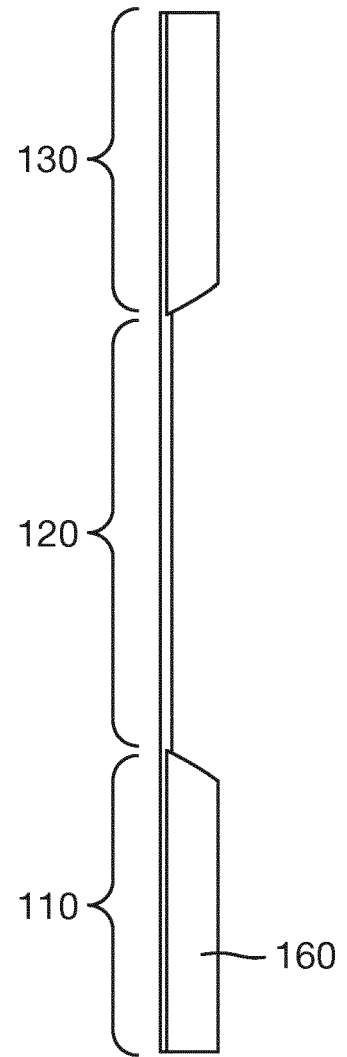
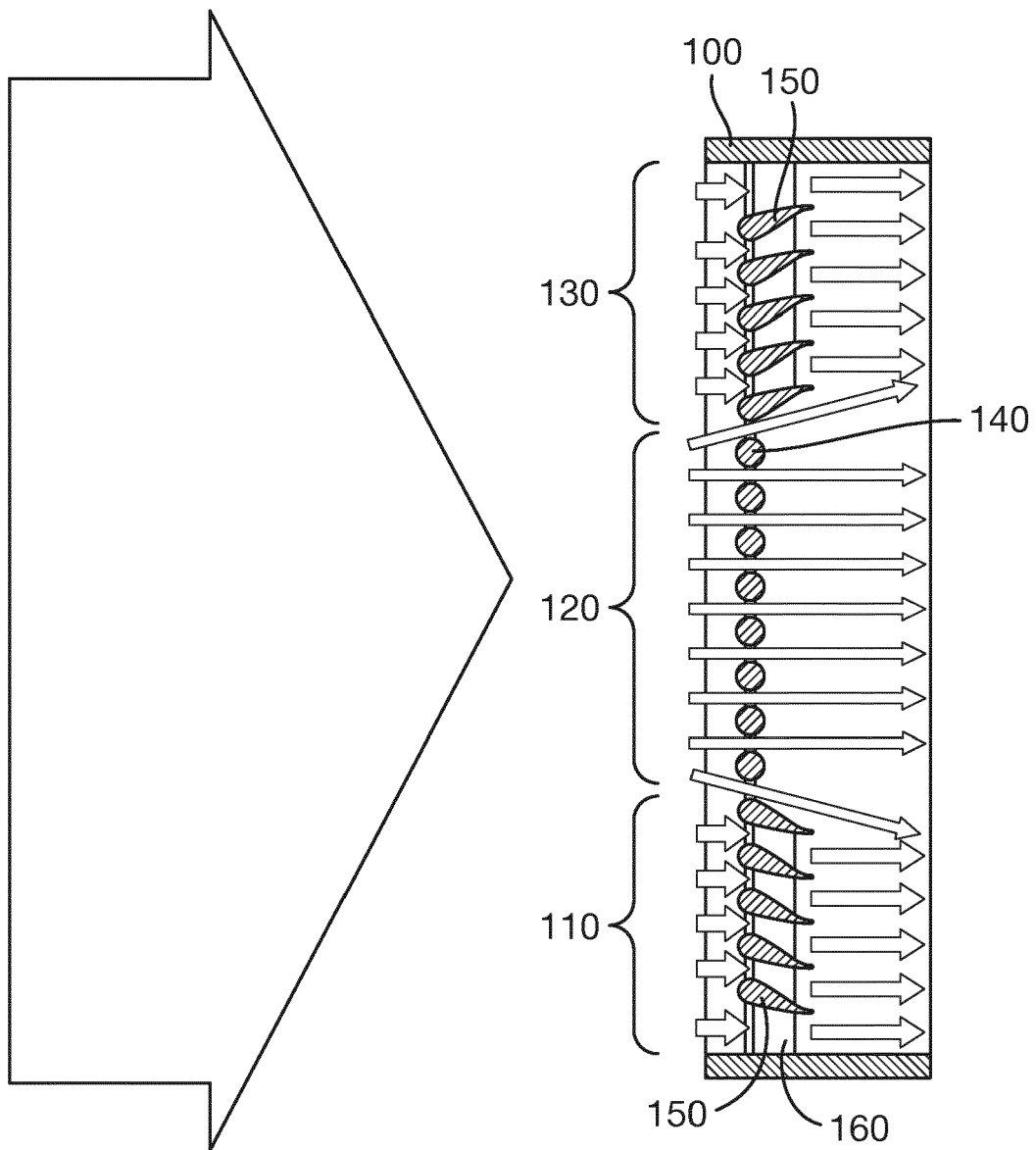


Fig. 5





EUROPEAN SEARCH REPORT

Application Number
EP 17 27 5021

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 24 July 2017	Examiner Degen, Marcello
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